

# PRACTICING Punnett Squares

Scientists know that every person receives one allele for a trait from their mom and one allele for a trait from their dad. Using our understanding of genetics, or how things are inherited, we can predict which traits offspring might show based on their parents' alleles.

For example, I am heterozygous for freckles. My mom has freckles and my dad does not. My husband is homozygous recessive; he does not have freckles. What are the odds that my child will have freckles?

My Phenotype is freckles

My genotype is Ff

My husband's phenotype is NO freckles

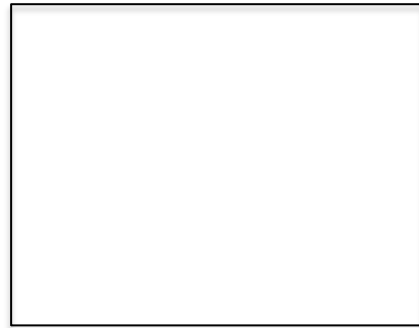
My husband's genotype is ff

Complete the Punnett Square for our traits  $Ff \times ff$ , then answer the questions

What are the possible genotypes and phenotypes for our child?

Genotype

Phenotype



What are the odds of our child having freckles?

%

How do you know this?

## Cartoon Breeding

Now that we have seen the application of genetics in a real life situation, let's use it in a pretend situation. You are going to breed some cartoon characters for pretend traits. You may **choose any 2 cartoons** you want (pick a boy and a girl, 2 boys, or 2 girls – it doesn't matter because these are cartoons and this is pretend). Once you have selected the parents, write their genotypes, create a Punnett Square for each trait of your cartoon characteristics (4 total Punnett squares). Answer the questions provided. Then, follow the directions to draw yourself the cartoon baby. So...

1. Select parents, write their Genotype
2. Breed parents and create a Punnett square for each trait
3. Answer questions, Draw your baby

## Our Imaginary Cartoon Trait Key

| Dominant Trait | Recessive Trait |
|----------------|-----------------|
| 1. Evil (G)    | Nice (g)        |
| 2. Fur (F)     | No fur (f)      |
| 3. Strong (S)  | Weak (s)        |
| 4. Smart (B)   | Simple (b)      |



**Wonder woman**  
gg, ff, SS, Bb



**The Grinch**  
Gg, FF, ss, Bb



**Belle**  
gg, ff, ss, BB



**Cruella Da Ville**  
GG, Ff, ss, Bb



**Garfield**  
Gg, FF, Ss, Bb



**Phineas**  
gg, ff, Ss, BB



**Gru**  
Gg, ff, Ss, BB



**Velma**  
gg, ff, ss, BB



**Superman**  
gg, ff, SS, BB



**Hello Kitty**  
gg, FF, ss, bb



**Homer**  
gg, ff, ss, bb



**Patrick**  
gg, ff, SS, bb

**Cartoon Breeding**

I am going to mate the following character:

Character's Name\_\_\_\_\_

| Phenotype | Genotype |
|-----------|----------|
|           |          |
|           |          |
|           |          |
|           |          |

Character's Name\_\_\_\_\_

| Phenotype | Genotype |
|-----------|----------|
|           |          |
|           |          |
|           |          |
|           |          |

**Punnett Square One (nice or evil)**

|   |   |   |
|---|---|---|
|   | — | — |
| — |   |   |
| — |   |   |

\_\_\_ % Good    \_\_\_ % Evil

**Punnett Square Three (Strong, Weak)**

|   |   |   |
|---|---|---|
|   | — | — |
| — |   |   |
| — |   |   |

\_\_\_ % Strong    \_\_\_ % Weak

**Punnett Square Two (Fur, no fur)**

|   |   |   |
|---|---|---|
|   | — | — |
| — |   |   |
| — |   |   |

\_\_\_ % Fur    \_\_\_ % No Fur

**Punnett Square Four (Smart, Simple)**

|   |   |   |
|---|---|---|
|   | — | — |
| — |   |   |
| — |   |   |

\_\_\_ % Smart    \_\_\_ % Simple

Now, to determine the offspring's inherited traits, we are going to flip a coin two times FOR EACH PUNNETT SQUARE. You will need to keep careful track of what you flip. **Circle the trait** your coin flips indicate:

head, head = top left square

tail, head = bottom left

head, tail = top right square

Tail, tail = bottom right square

Record your offspring's information here by writing down the circled alleles:

|          |
|----------|
| GENOTYPE |
|          |
|          |
|          |
|          |

Explain what your child looks and acts like:

Now, draw a picture of the cartoon baby you have created:

Suppose you want to create a VERY nice baby, who would you mate?

Suppose Phineaus wanted to produce a strong baby, who should he mate with?

What are the odds that Cruella Da Ville will have a nice baby? (show your work)